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SEQUENCE LISTING

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<120> Compounds and Methods for the Treatment  
and Prevention of Bacterial Infection

<130> 00742/060002

<140> US 09/848,909

<141> 2001-05-04

<150> US 60/201,800

<151> 2000-05-04

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Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
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Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
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Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
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245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
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 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
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 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
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 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
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 Ala Pro Ile Ala Leu Asn Ala Gln Asp Phe Ser Ser Thr Pro Ile  
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 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
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 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
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 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
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 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
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 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
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 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
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 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
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 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
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 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
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 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
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Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
50 55 60  
Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
65 70 75 80  
Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
85 90 95  
Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
100 105 110  
Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
115 120 125  
Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
130 135 140  
Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
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Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
165 170 175  
Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
180 185 190  
Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
195 200 205  
Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
210 215 220  
Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
225 230 235 240  
Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
245 250 255  
Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
260 265 270  
Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
275 280 285  
Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
290 295 300  
Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
305 310 315 320  
Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
325 330 335  


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340 345 350  
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355 360 365  
Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
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Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Asp Glu Asn Gln

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                                  420                      425                      430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
                                  435                      440                      445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
                                  450                      455                      460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465                      470                      475                      480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
                                  485                      490                      495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
                                  500                      505                      510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
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 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
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 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545                      550                      555                      560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
                                  565                      570                      575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
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 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
                                  595                      600                      605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
                                  610                      615                      620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625                      630                      635                      640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
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 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
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 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
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 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
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                                  20                      25                      30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
                                  35                      40                      45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
                                  50                      55                      60

Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
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 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
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 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
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 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
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 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
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 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
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 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
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 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Thr Ile Ser  
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 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
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 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
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 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
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 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
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 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
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 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
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 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
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 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
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 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly

530		535		540
Lys Asp Ile Thr Glu Phe	Asp Phe Asn Phe Asp	Gln Gln Thr Ser Gln		
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Asn Ile Lys Asn Gln Leu	Ala Glu Leu Asn Ala	Thr Asn Ile Tyr Thr		
	565	570	575	
Val Leu Asp Lys Ile Lys	Leu Asn Ala Lys Met	Asn Ile Leu Ile Arg		
	580	585	590	
Asp Lys Arg Phe His Tyr	Asp Arg Asn Asn Ile	Ala Val Gly Ala Asp		
	595	600	605	
Glu Ser Val Val Lys Glu	Ala His Arg Glu Val	Ile Asn Ser Ser Thr		
	610	615	620	
Glu Gly Leu Leu Leu Asn	Ile Asp Lys Asp Ile	Arg Lys Ile Leu Ser		
625	630	635	640	
Gly Tyr Ile Val Glu Ile	Glu Asp Thr Glu Gly	Leu Lys Glu Val Ile		
	645	650	655	
Asn Asp Arg Tyr Asp Met	Leu Asn Ile Ser Ser	Leu Arg Gln Asp Gly		
	660	665	670	
Lys Thr Phe Ile Asp Phe	Lys Lys Tyr Asn Asp	Lys Leu Pro Leu Tyr		
	675	680	685	
Ile Ser Asn Pro Asn Tyr	Lys Val Asn Val Tyr	Ala Val Thr Lys Glu		
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Asn Thr Ile Ile Asn Pro	Ser Glu Asn Gly Asp	Thr Ser Thr Asn Gly		
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Met Val Val Thr Ser Ser	Thr Thr Gly Asp	Leu Ser Ile Pro Ser Ser
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Glu Leu Glu Asn Ile Pro	Ser Glu Asn Gln Tyr	Phe Gln Ser Ala Ile
	50	55
Trp Ser Gly Phe Ile Lys	Val Lys Lys Ser Asp	Glu Tyr Thr Phe Ala
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Thr Ser Ala Asp Asn His	Val Thr Met Trp Val	Asp Asp Gln Glu Val
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Ile Asn Lys Ala Ser Asn	Ser Asn Lys Ile Arg	Leu Glu Lys Gly Arg
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Leu Tyr Gln Ile Lys Ile	Gln Tyr Gln Arg Glu	Asn Pro Thr Glu Lys
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Gly Leu Asp Phe Lys Leu	Tyr Trp Thr Asp Ser	Gln Asn Lys Lys Glu
	130	135
Val Ile Ser Ser Asp Asn	Leu Gln Leu Pro Glu	Leu Lys Gln Lys Ser
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Ser Asn Ser Arg Lys Lys	Arg Ser Thr Ser Ala	Gly Pro Thr Val Pro
	165	170
Asp Arg Asp Asn Asp Gly	Ile Pro Asp Ser Leu	Glu Val Glu Gly Tyr
	180	185
Thr Val Asp Val Lys Asn	Lys Arg Thr Phe Leu	Ser Pro Trp Ile Ser
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12

Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu
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Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr
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Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val
				245					250						255
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser
			260					265					270		
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr
		275					280					285			
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His
290						295					300				
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val
305					310					315					320
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His
				325					330					335	
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu
			340					345					350		
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn
		355					360					365			
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val
370						375					380				
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Gln	Glu	Asn	Gln
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Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu
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Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Phe	Ser	Ser	Thr	Pro	Ile	
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Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu
		435					440					445			
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe
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Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys
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Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp
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Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys
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Ile	Ala	Phe	Gly	Phe	Asn	Glu	Pro	Asn	Gly	Asn	Leu	Gln	Tyr	Gln	Gly
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Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln
545					550					555					560
Asn	Ile	Lys	Asn	Gln	Leu	Ala	Glu	Leu	Asn	Ala	Thr	Asn	Ile	Tyr	Thr
				565					570					575	
Val	Leu	Asp	Lys	Ile	Lys	Leu	Asn	Ala	Lys	Met	Asn	Ile	Leu	Ile	Arg
			580				585						590		
Asp	Lys	Arg	Phe	His	Tyr	Asp	Arg	Asn	Asn	Ile	Ala	Val	Gly	Ala	Asp
		595					600					605			
Glu	Ser	Val	Val	Lys	Glu	Ala	His	Arg	Glu	Val	Ile	Asn	Ser	Ser	Thr
610						615					620				
Glu	Gly	Leu	Leu	Leu	Asn	Ile	Asp	Lys	Asp	Ile	Arg	Lys	Ile	Leu	Ser
625					630					635					640
Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile
				645					650					655	
Asn	Asp	Arg	Tyr	Asp	Met	Leu	Asn	Ile	Ser	Ser	Leu	Arg	Gln	Asp	Gly
			660					665					670		
Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr





Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
 385 390 395 400  
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 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Ala Asp Phe Ser Ser Thr Pro Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
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 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
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 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
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 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
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 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
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 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
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<213> Bacillus anthracis

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12

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Met Val	Val Thr Ser Ser Thr Thr	Gly Asp Leu Ser Ile Pro Ser Ser			
	35	40	45		
Glu Leu	Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile				
	50	55	60		
Trp Ser	Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala				
65	70	75	80		
Thr Ser	Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val				
	85	90	95		
Ile Asn	Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg				
	100	105	110		
Leu Tyr	Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys				
	115	120	125		
Gly Leu	Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu				
	130	135	140		
Val Ile	Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser				
145	150	155	160		
Ser Asn	Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro				
	165	170	175		
Asp Arg	Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr				
	180	185	190		
Thr Val	Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser				
	195	200	205		
Asn Ile	His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu				
	210	215	220		
Lys Trp	Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr				
225	230	235	240		
Gly Arg	Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val				
	245	250	255		
Ala Ala	Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser				
	260	265	270		
Lys Asn	Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr				
	275	280	285		
Ile Ser	Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His				
	290	295	300		
Gly Asn	Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val				
305	310	315	320		
Ser Ala	Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His				
	325	330	335		
Ser Leu	Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu				
	340	345	350		
Asn Thr	Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn				
	355	360	365		
Thr Gly	Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val				
	370	375	380		
Leu Gly	Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln				
385	390	395	400		
Leu Ser	Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu				
	405	410	415		
Ala Pro	Ile Ala Leu Asn Ala Gln Asn Asp Phe Ser Ser Thr Pro Ile				
	420	425	430		
Thr Met	Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu				
	435	440	445		
Arg Leu	Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe				
	450	455	460		
Glu Asn	Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val				
465	470	475	480		
Leu Pro	Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys				
	485	490	495		

Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly  
 725 730 735

C2

<210> 7  
 <211> 735  
 <212> PRT  
 <213> Bacillus anthracis

<400> 7  
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
 1 5 10 15  
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
~~Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys~~  
~~115 120 125~~  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro



Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
                                 645                                650                                655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
                                 660                                665                                670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
                                 675                                680                                685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
                                 690                                695                                700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705                                710                                715                                720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly  
                                 725                                730                                735

<210> 8  
 <211> 735  
 <212> PRT  
 <213> Bacillus anthracis

<400> 8  
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
 1                                5                                10                                15  
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
                                 20                                25                                30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
                                 35                                40                                45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
                                 50                                55                                60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65                                70                                75                                80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
                                 85                                90                                95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
                                 100                                105                                110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
                                 115                                120                                125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
                                 130                                135                                140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145                                150                                155                                160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
                                 165                                170                                175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
                                 180                                185                                190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
                                 195                                200                                205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
                                 210                                215                                220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225                                230                                235                                240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
                                 245                                250                                255  
~~Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser~~  
                                 260                                265                                270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
                                 275                                280                                285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
                                 290                                295                                300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val



<400> 9

Glu	Val	Lys	Gln	Glu	Asn	Arg	Leu	Leu	Asn	Glu	Ser	Glu	Ser	Ser	Ser
1				5					10					15	
Gln	Gly	Leu	Leu	Gly	Tyr	Tyr	Phe	Ser	Asp	Leu	Asn	Phe	Gln	Ala	Pro
			20				25						30		
Met	Val	Val	Thr	Ser	Ser	Thr	Thr	Gly	Asp	Leu	Ser	Ile	Pro	Ser	Ser
		35					40					45			
Glu	Leu	Glu	Asn	Ile	Pro	Ser	Glu	Asn	Gln	Tyr	Phe	Gln	Ser	Ala	Ile
	50					55					60				
Trp	Ser	Gly	Phe	Ile	Lys	Val	Lys	Lys	Ser	Asp	Glu	Tyr	Thr	Phe	Ala
65					70					75				80	
Thr	Ser	Ala	Asp	Asn	His	Val	Thr	Met	Trp	Val	Asp	Asp	Gln	Glu	Val
				85					90					95	
Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg
			100					105					110		
Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys
		115					120					125			
Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu
	130					135					140				
Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser
145					150					155					160
Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro
				165					170					175	
Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr
			180					185					190		
Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser
		195					200					205			
Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu
	210					215					220				
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr
225					230					235					240
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val
				245					250					255	
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser
			260					265					270		
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr
		275					280					285			
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His
	290					295					300				
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val
305					310				315						320
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His
				325					330					335	
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu
			340					345					350		
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn
		355					360					365			
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val
	370					375					380				
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln
385					390					395					400
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu
				405					410					415	
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Ala	Ser	Ser	Thr	Pro	Ile
			420					425					430		
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu
		435					440					445			
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe
	450					455					460				

Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly  
 725 730 735

<210> 10  
 <211> 735  
 <212> PRT  
 <213> Bacillus anthracis

<400> 10  
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
 1 5 10 15  
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
~~Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val~~  
~~85 90 95~~  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu



130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Asp Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Lys Asp Phe Ser Ser Thr Pro Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605

Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly  
 725 730 735

<210> 11  
 <211> 735  
 <212> PRT  
 <213> Bacillus anthracis

<400> 11  
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
~~Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr~~  
~~225 230 235 240~~  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr

275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Asp Ala Asp Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Lys Lys Phe Ser Ser Thr Pro Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly  
 725 730 735

<210> 12  
 <211> 711  
 <212> PRT  
 <213> Bacillus anthracis

<400> 12

Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
 1 5 10 15  
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Asn Ser Asn  
 290 295 300  
 Ser Ser Thr Val Ala Ile Asp His Ser Leu Ser Leu Ala Gly Glu Arg  
 305 310 315 320  
 Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala Asp Thr Ala Arg Leu  
 325 330 335  
 Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr Ala Pro Ile Tyr Asn  
 340 345 350  
 Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys Asn Gln Thr Leu Ala  
 355 360 365  
 Thr Ile Lys Ala Lys Glu Asn Gln Leu Ser Gln Ile Leu Ala Pro Asn  
 370 375 380  
 Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile Ala Leu Asn Ala Gln  
 385 390 395 400  
 Asp Asp Phe Ser Ser Thr Pro Ile Thr Met Asn Tyr Asn Gln Phe Leu  
 405 410 415  
 Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp Thr Asp Gln Val Tyr

420 425 430  
 Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly Arg Val Arg Val Asp  
 435 440 445  
 Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln Ile Gln Glu Thr Thr  
 450 455 460  
 Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn Leu Val Glu Arg Arg  
 465 470 475 480  
 Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu Thr Thr Lys Pro Asp  
 485 490 495  
 Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe Gly Phe Asn Glu Pro  
 500 505 510  
 Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile Thr Glu Phe Asp Phe  
 515 520 525  
 Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys Asn Gln Leu Ala Glu  
 530 535 540  
 Leu Asn Ala Thr Asn Ile Tyr Thr Val Leu Asp Lys Ile Lys Leu Asn  
 545 550 555 560  
 Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg Phe His Tyr Asp Arg  
 565 570 575  
 Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val Val Lys Glu Ala His  
 580 585 590  
 Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu Leu Leu Asn Ile Asp  
 595 600 605  
 Lys Asp Ile Arg Lys Ile Leu Ser Gly Tyr Ile Val Glu Ile Glu Asp  
 610 615 620  
 Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg Tyr Asp Met Leu Asn  
 625 630 635 640  
 Ile Ser Ser Leu Arg Gln Asp Gly Lys Thr Phe Ile Asp Phe Lys Lys  
 645 650 655  
 Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn Pro Asn Tyr Lys Val  
 660 665 670  
 Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile Ile Asn Pro Ser Glu  
 675 680 685  
 Asn Gly Asp Thr Ser Thr Asn Gly Ile Lys Lys Ile Leu Ile Phe Ser  
 690 695 700  
 Lys Lys Gly Tyr Glu Ile Gly  
 705 710

<210> 13  
 <211> 735  
 <212> PRT  
 <213> Bacillus anthracis

<400> 13  
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
 1 5 10 15  
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110

Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Asp Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Lys Asp Ala Ser Ser Thr Pro Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg



Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Asn Ser Asn  
 290 295 300  
 Ser Ser Thr Val Ala Ile Asp His Ser Leu Ser Leu Ala Gly Glu Arg  
 305 310 315 320  
 Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala Asp Thr Ala Arg Leu  
 325 330 335  
 Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr Ala Pro Ile Tyr Asn  
 340 345 350  
 Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys Asn Gln Thr Leu Ala  
 355 360 365  
 Thr Ile Lys Ala Lys Glu Asn Gln Leu Ser Gln Ile Leu Ala Pro Asn  
 370 375 380  
 Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile Ala Leu Asn Ala Gln  
 385 390 395 400  
 Asp Asp Ala Ser Ser Thr Pro Ile Thr Met Asn Tyr Asn Gln Phe Leu  
 405 410 415  
 Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp Thr Asp Gln Val Tyr  
 420 425 430  
 Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly Arg Val Arg Val Asp  
 435 440 445  
 Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln Ile Gln Glu Thr Thr  
 450 455 460  
 Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn Leu Val Glu Arg Arg  
 465 470 475 480  
 Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu Thr Thr Lys Pro Asp  
 485 490 495  
 Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe Gly Phe Asn Glu Pro  
 500 505 510  
 Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile Thr Glu Phe Asp Phe  
 515 520 525  
 Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys Asn Gln Leu Ala Glu  
 530 535 540  
 Leu Asn Ala Thr Asn Ile Tyr Thr Val Leu Asp Lys Ile Lys Leu Asn  
 545 550 555 560  
 Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg Phe His Tyr Asp Arg  
 565 570 575  
 Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val Val Lys Glu Ala His  
 580 585 590  
 Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu Leu Leu Asn Ile Asp  
 595 600 605  
 Lys Asp Ile Arg Lys Ile Leu Ser Gly Tyr Ile Val Glu Ile Glu Asp  
 610 615 620  
 Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg Tyr Asp Met Leu Asn  
 625 630 635 640  
 Ile Ser Ser Leu Arg Gln Asp Gly Lys Thr Phe Ile Asp Phe Lys Lys  
 645 650 655  
 Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn Pro Asn Tyr Lys Val  
 660 665 670  
 Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile Ile Asn Pro Ser Glu  
 675 680 685  
 Asn Gly Asp Thr Ser Thr Asn Gly Ile Lys Lys Ile Leu Ile Phe Ser  
 690 695 700  
 Lys Lys Gly Tyr Glu Ile Gly  
 705 710



<210> 15  
 <211> 711  
 <212> PRT  
 <213> Bacillus anthracis

<400> 15  
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
 1 5 10 15  
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Asn Ser Asn  
 290 295 300  
 Ser Ser Thr Val Ala Ile Asp His Ser Leu Ser Leu Ala Gly Glu Arg  
 305 310 315 320  
 Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala Asp Thr Ala Arg Leu  
 325 330 335  
 Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr Ala Pro Ile Tyr Asn  
 340 345 350  
 Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys Asn Gln Thr Leu Ala  
 355 360 365  
 Thr Ile Lys Ala Asp Glu Asn Gln Leu Ser Gln Ile Leu Ala Pro Asn  
 370 375 380  
 Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile Ala Leu Asn Ala Gln  
 385 390 395 400  
 Asp Asp Ala Ser Ser Thr Pro Ile Thr Met Asn Tyr Asn Gln Phe Leu  
 405 410 415  
 Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp Thr Asp Gln Val Tyr

420 425 430  
 Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly Arg Val Arg Val Asp  
 435 440 445  
 Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln Ile Gln Glu Thr Thr  
 450 455 460  
 Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn Leu Val Glu Arg Arg  
 465 470 475 480  
 Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu Thr Thr Lys Pro Asp  
 485 490 495  
 Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe Gly Phe Asn Glu Pro  
 500 505 510  
 Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile Thr Glu Phe Asp Phe  
 515 520 525  
 Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys Asn Gln Leu Ala Glu  
 530 535 540  
 Leu Asn Ala Thr Asn Ile Tyr Thr Val Leu Asp Lys Ile Lys Leu Asn  
 545 550 555 560  
 Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg Phe His Tyr Asp Arg  
 565 570 575  
 Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val Val Lys Glu Ala His  
 580 585 590  
 Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu Leu Leu Asn Ile Asp  
 595 600 605  
 Lys Asp Ile Arg Lys Ile Leu Ser Gly Tyr Ile Val Glu Ile Glu Asp  
 610 615 620  
 Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg Tyr Asp Met Leu Asn  
 625 630 635 640  
 Ile Ser Ser Leu Arg Gln Asp Gly Lys Thr Phe Ile Asp Phe Lys Lys  
 645 650 655  
 Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn Pro Asn Tyr Lys Val  
 660 665 670  
 Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile Ile Asn Pro Ser Glu  
 675 680 685  
 Asn Gly Asp Thr Ser Thr Asn Gly Ile Lys Lys Ile Leu Ile Phe Ser  
 690 695 700  
 Lys Lys Gly Tyr Glu Ile Gly  
 705 710

<210> 16  
 <211> 711  
 <212> PRT  
 <213> Bacillus anthracis

<400> 16  
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
 1 5 10 15  
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110

Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Asn Ser Asn  
 290 295 300  
 Ser Ser Thr Val Ala Ile Asp His Ser Leu Ser Leu Ala Gly Glu Arg  
 305 310 315 320  
 Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala Asp Thr Ala Arg Leu  
 325 330 335  
 Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr Ala Pro Ile Tyr Asn  
 340 345 350  
 Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys Asn Gln Thr Leu Ala  
 355 360 365  
 Thr Ile Lys Ala Asp Glu Asn Gln Leu Ser Gln Ile Leu Ala Pro Asn  
 370 375 380  
 Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile Ala Leu Asn Ala Gln  
 385 390 395 400  
 Lys Asp Ala Ser Ser Thr Pro Ile Thr Met Asn Tyr Asn Gln Phe Leu  
 405 410 415  
 Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp Thr Asp Gln Val Tyr  
 420 425 430  
 Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly Arg Val Arg Val Asp  
 435 440 445  
 Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln Ile Gln Glu Thr Thr  
 450 455 460  
 Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn Leu Val Glu Arg Arg  
 465 470 475 480  
 Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu Thr Thr Lys Pro Asp  
 485 490 495  
 Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe Gly Phe Asn Glu Pro  
 500 505 510  
 Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile Thr Glu Phe Asp Phe  
 515 520 525  
 Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys Asn Gln Leu Ala Glu  
 530 535 540

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Leu Asn Ala Thr Asn Ile Tyr Thr Val Leu Asp Lys Ile Lys Leu Asn  
 545 550 555 560  
 Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg Phe His Tyr Asp Arg  
 565 570 575  
 Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val Val Lys Glu Ala His



Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Ser Ser Thr Pro Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly  
 725 730 735

<210> 18  
 <211> 735  
 <212> PRT  
 <213> Bacillus anthracis

<400> 18

Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380

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Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Lys Ser Ser Thr Pro Ile

420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly  
 725 730 735

<210> 19  
 <211> 735  
 <212> PRT  
 <213> Bacillus anthracis

<220>  
 <221> VARIANT  
 <222> 397  
 <223> Xaa = any amino acid except Lys

<400> 19  
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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile

50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Xaa Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525



Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly  
 725 730 735

C2

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 <211> 735  
 <212> PRT  
 <213> Bacillus anthracis

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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
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 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser

195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670

Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly  
 725 730 735

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 <211> 735  
 <212> PRT  
 <213> Bacillus anthracis

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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
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 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
~~Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His~~  
~~290 295 300~~  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu

340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly  
 725 730 735

<210> 22

<211> 2208

<212> DNA

<213> Bacillus anthracis

<400> 22

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 ggatactatt ttagtgattt gaattttcaa gcacccatgg tggttacctc ttctactaca 120

ggggatttat ctattcctag ttctgagtta gaaaatattc catcggaata ccaatatttt 180  
 caatctgcta tttggctcagg atttatcaaa gttaagaaga gtgatgaata tacatttgct 240  
 acttccgctg ataatcatgt aacaatgtgg gtagatgacc aagaagtgat taataaagct 300  
 tctaattcta acaaaatcag attagaaaaa ggaagattat atcaataaaa aattcaatat 360  
 caacgagaaa atcctactga aaaaggattg gatttcaagt tgtactggac cgattctcaa 420  
 aataaaaaag aagtgatttc tagtgataac ttacaattgc cagaattaaa acaaaaatct 480  
 tcgaactcaa gaaaaaagcg aagtacaagt gctggaccta cggttccaga ccgtgacaat 540  
 gatggaatcc ctgattcatt agaggtagaa ggatatacgg ttgatgtcaa aaataaaaaga 600  
 acttttcttt caccatggat ttctaatttt catgaaaaga aaggattaac caaatataaa 660  
 tcatctctcg aaaaatggag cacggcttct gatccgtaca gtgatttcga aaagggttaca 720  
 ggacgggattg ataagaatgt atcaccagag gcaagacacc cccttggtgc agcttatccg 780  
 attgtacatg tagatatgga gaattatttt ctctcaaaaa atgaggatca atccacacag 840  
 aatactgata gtgaaacgag aacaataagt aaaaatactt ctacaagtag gacacatact 900  
 agtgaagtac atggaaatgc agaagtgcac gcgctggtct ttgatattgg tgggagtgta 960  
 tctgcaggat ttagtaattc gaattcaagt acggctcgca ttgatcattc actatctcta 1020  
 gcaggggaaa gaacttgggc tgaacaatag ggtttaaata ccgctgatac agcaagatta 1080  
 aatgccaaata ttagatatgt aaatactggg acggctccaa tctacaacgt gttaccaacg 1140  
 acttcgtagg tgtaggaaa aaatcaaaac ctccgcgcaa ttaaagctaa ggaaaaccaa 1200  
 ttaagtcaaa tacttgacac taataattat tatccttcta aaaacttggc gccaatcgca 1260  
 ttaaatgcac aagacgattt cagttctact ccaattacaa tgaattacaa tcaatttctt 1320  
 gagttagaaa aaacgaaaca attaagatta gatacggatc aagtatatgg gaatatagca 1380  
 acatacaatt ttgaaaatgg aagagtgagg gtggatacag gctcgaactg gagtgaagtg 1440  
 ttaccgcaaa ttcaagaaac aactgcacgt atcatittta atggaaaaga tttaaactctg 1500  
 gtgaaaaggc ggatagcggc ggttaatcct agtgatccat tagaaacgac taaaccggat 1560  
 atgacattaa aagaagccct taaaatagca tttggattta acgaaccgaa tggaaactta 1620  
 caatatcaag ggaaagacat aaccgaattt gattttaatt tcgatcaaca aacatctcaa 1680  
 aatatcaaga atcagttagc ggaattaaac gcaactaaca tatatactgt attagataaa 1740  
 atcaaatata atgcaaaaat gaattattta ataagagata aacgttttca ttatgataga 1800  
 aataacatag cagttggggc ggatgagtca gtagttaagg aggctcatag agaagtaatt 1860  
 aattcgtaaa cagagggatt attgttaaat attgataagg atataagaaa aatattatca 1920  
 gggtatattg tagaaattga agatactgaa gggcttaaa aagtataaaa tgacagatat 1980  
 gatattgtga atatttctag ttacggcaa gatggaaaaa catttataga ttttaaaaaa 2040  
 tataatgata aattaccgtt atatataggt aatcccaatt ataaggtaaa tgtatatgct 2100  
 gttactaaag aaaacactat tattaatcct agtgagaatg gggatactag taccaacggg 2160  
 atcaagaaaa ttttaattct ttctaaaaaa ggctatgaga taggataa 2208

<210> 23  
 <211> 735  
 <212> PRT  
 <213> Bacillus anthracis  
  
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 <221> VARIANT  
 <222> 427  
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<400> 23  
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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
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 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95

Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Xaa Ser Ser Thr Pro Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr

565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
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 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly  
 725 730 735

<210> 24  
 <211> 599  
 <212> PRT  
 <213> Bacillus anthracis

42  
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 Thr Ser Ala Gly Pro Thr Val Pro Asp Arg Asp Asn Asp Gly Ile Pro  
 35 40 45  
 Asp Ser Leu Glu Val Glu Gly Tyr Thr Val Asp Val Lys Asn Lys Arg  
 50 55 60  
 Thr Phe Leu Ser Pro Trp Ile Ser Asn Ile His Glu Lys Lys Gly Leu  
 65 70 75 80  
 Thr Lys Tyr Lys Ser Ser Pro Glu Lys Trp Ser Thr Ala Ser Asp Pro  
 85 90 95  
 Tyr Ser Asp Phe Glu Lys Val Thr Gly Arg Ile Asp Lys Asn Val Ser  
 100 105 110  
 Pro Glu Ala Arg His Pro Leu Val Ala Ala Tyr Pro Ile Val His Val  
 115 120 125  
 Asp Met Glu Asn Ile Ile Leu Ser Lys Asn Glu Asp Gln Ser Thr Gln  
 130 135 140  
 Asn Thr Asp Ser Gln Thr Arg Thr Ile Ser Lys Asn Thr Ser Thr Ser  
 145 150 155 160  
 Arg Thr His Thr Ser Glu Val His Gly Asn Ala Glu Val His Ala Ser  
 165 170 175  
 Phe Phe Asp Ile Gly Gly Ser Val Ser Ala Gly Phe Ser Asn Ser Asn  
 180 185 190  
 Ser Ser Thr Val Ala Ile Asp His Ser Leu Ser Leu Ala Gly Glu Arg  
 195 200 205  
 Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala Asp Thr Ala Arg Leu  
 210 215 220  
 Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr Ala Pro Ile Tyr Asn  
 225 230 235 240

Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys Asn Gln Thr Leu Ala  
 245 250 255  
 Thr Ile Lys Ala Lys Glu Asn Gln Leu Ser Gln Ile Leu Ala Pro Asn  
 260 265 270  
 Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile Ala Leu Asn Ala Gln  
 275 280 285  
 Asp Asp Phe Ser Ser Thr Pro Ile Thr Met Asn Tyr Asn Gln Phe Leu  
 290 295 300  
 Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp Thr Asp Gln Val Tyr  
 305 310 315 320  
 Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly Arg Val Arg Val Asp  
 325 330 335  
 Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln Ile Gln Glu Thr Thr  
 340 345 350  
 Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn Leu Val Glu Arg Arg  
 355 360 365  
 Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu Thr Thr Lys Pro Asp  
 370 375 380  
 Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe Gly Phe Asn Glu Pro  
 385 390 395 400  
 Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile Thr Glu Phe Asp Phe  
 405 410 415  
 Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys Asn Gln Leu Ala Glu  
 420 425 430  
 Leu Asn Val Thr Asn Ile Tyr Thr Val Leu Asp Lys Ile Lys Leu Asn  
 435 440 445  
 Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg Phe His Tyr Asp Arg  
 450 455 460  
 Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val Val Lys Glu Ala His  
 465 470 475 480  
 Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu Leu Leu Asn Ile Asp  
 485 490 495  
 Lys Asp Ile Arg Lys Ile Leu Ser Gly Tyr Ile Val Glu Ile Glu Asp  
 500 505 510  
 Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg Tyr Asp Met Leu Asn  
 515 520 525  
 Ile Ser Ser Leu Arg Gln Asp Gly Lys Thr Phe Ile Asp Phe Lys Lys  
 530 535 540  
 Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn Pro Asn Tyr Lys Val  
 545 550 555 560  
 Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile Ile Asn Pro Ser Glu  
 565 570 575  
 Asn Gly Asp Thr Ser Thr Asn Gly Ile Lys Lys Ile Leu Ile Phe Ser  
 580 585 590  
 Lys Lys Gly Tyr Glu Ile Gly  
 595

<210> 25  
 <211> 705  
 <212> PRT  
 <213> Clostridium difficile

<400> 25  
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 Arg Asp Tyr Ser Asn Ile Glu Lys Asp Asp Pro Phe Ile Pro Asn Asn  
 20 25 30  
 Asn Phe Phe Asp Pro Lys Leu Met Ser Asp Trp Glu Asp Glu Asp Leu



35 40 45  
 Asp Thr Asp Asn Asp Asn Ile Pro Asp Ser Tyr Glu Arg Asn Gly Tyr  
 50 55 60  
 Thr Ile Lys Asp Leu Ile Ala Val Lys Trp Glu Asp Ser Phe Ala Glu  
 65 70 75 80  
 Gln Gly Tyr Lys Lys Tyr Val Ser Asn Tyr Leu Glu Ser Asn Thr Ala  
 85 90 95  
 Gly Asp Pro Tyr Thr Asp Tyr Glu Lys Ala Ser Gly Ser Phe Asp Lys  
 100 105 110  
 Ala Ile Lys Thr Glu Ala Arg Asp Pro Leu Val Ala Ala Tyr Pro Ile  
 115 120 125  
 Val Gly Val Gly Met Glu Lys Leu Ile Ile Ser Thr Asn Glu His Ala  
 130 135 140  
 Ser Thr Asp Gln Gly Lys Thr Val Ser Arg Ala Thr Thr Asn Ser Lys  
 145 150 155 160  
 Thr Glu Ser Asn Thr Ala Gly Val Ser Val Asn Val Gly Tyr Gln Asn  
 165 170 175  
 Gly Phe Thr Ala Asn Val Thr Thr Asn Tyr Ser His Thr Thr Asp Asn  
 180 185 190  
 Ser Thr Ala Val Gln Asp Ser Asn Gly Glu Ser Trp Asn Thr Gly Leu  
 195 200 205  
 Ser Ile Asn Lys Gly Glu Ser Ala Tyr Ile Asn Ala Asn Val Arg Tyr  
 210 215 220  
 Tyr Asn Thr Gly Thr Ala Pro Met Tyr Lys Val Thr Pro Thr Thr Asn  
 225 230 235 240  
 Leu Val Leu Asp Gly Asp Thr Leu Ser Thr Ile Lys Ala Gln Glu Asn  
 245 250 255  
 Gln Ile Gly Asn Asn Leu Ser Pro Gly Asp Thr Tyr Pro Lys Lys Gly  
 260 265 270  
 Leu Ser Pro Leu Ala Leu Asn Thr Met Asp Gln Phe Ser Ser Arg Leu  
 275 280 285  
 Ile Pro Ile Asn Tyr Asp Gln Leu Lys Lys Leu Asp Ala Gly Lys Gln  
 290 295 300  
 Ile Lys Leu Glu Thr Thr Gln Val Ser Gly Asn Phe Gly Thr Lys Asn  
 305 310 315 320  
 Ser Ser Gly Gln Ile Val Thr Glu Gly Asn Ser Trp Ser Asp Tyr Ile  
 325 330 335  
 Ser Gln Ile Asp Ser Ile Ser Ala Ser Ile Ile Leu Asp Thr Glu Asn  
 340 345 350  
 Glu Ser Tyr Glu Arg Arg Val Thr Ala Lys Asn Leu Gln Asp Pro Glu  
 355 360 365  
 Asp Lys Thr Pro Glu Leu Thr Ile Gly Glu Ala Ile Glu Lys Ala Phe  
 370 375 380  
 Gly Ala Thr Lys Lys Asp Gly Leu Leu Tyr Phe Asn Asp Ile Pro Ile  
 385 390 395 400  
 Asp Glu Ser Cys Val Glu Leu Ile Phe Asp Asp Asn Thr Ala Asn Lys  
 405 410 415  
 Ile Lys Asp Ser Leu Lys Thr Leu Ser Asp Lys Lys Ile Tyr Asn Val  
 420 425 430  
 Lys Leu Glu Arg Gly Met Asn Ile Leu Ile Lys Thr Pro Thr Tyr Phe  
 435 440 445  
 Thr Asn Phe Asp Asp Tyr Asn Asn Tyr Pro Ser Thr Trp Ser Asn Val  
 450 455 460  
 Asn Thr Thr Asn Gln Asp Gly Leu Gln Gly Ser Ala Asn Lys Leu Asn  
 465 470 475 480  
 Gly Glu Thr Lys Ile Lys Ile Pro Met Ser Glu Leu Lys Pro Tyr Lys  
 485 490 495  
 Arg Tyr Val Phe Ser Gly Tyr Ser Lys Asp Pro Leu Thr Ser Asn Ser  
 500 505 510

Ile Ile Val Lys Ile Lys Ala Lys Glu Glu Lys Thr Asp Tyr Leu Val  
 515 520 525  
 Pro Glu Gln Gly Tyr Thr Lys Phe Ser Tyr Glu Phe Glu Thr Thr Glu  
 530 535 540  
 Lys Asp Ser Ser Asn Ile Glu Ile Thr Leu Ile Gly Ser Gly Thr Thr  
 545 550 555 560  
 Tyr Leu Asp Asn Leu Ser Ile Thr Glu Leu Asn Ser Thr Pro Glu Ile  
 565 570 575  
 Leu Asp Glu Pro Glu Val Lys Ile Pro Thr Asp Gln Glu Ile Met Asp  
 580 585 590  
 Ala His Lys Ile Tyr Phe Ala Asp Leu Asn Phe Asn Pro Ser Thr Gly  
 595 600 605  
 Asn Thr Tyr Ile Asn Gly Met Tyr Phe Ala Pro Thr Gln Thr Asn Lys  
 610 615 620  
 Glu Ala Leu Asp Tyr Ile Gln Lys Tyr Arg Val Glu Ala Thr Leu Gln  
 625 630 635 640  
 Tyr Ser Gly Phe Lys Asp Ile Gly Thr Lys Asp Lys Glu Met Arg Asn  
 645 650 655  
 Tyr Leu Gly Asp Pro Asn Gln Pro Lys Thr Asn Tyr Val Asn Leu Arg  
 660 665 670  
 Ser Tyr Phe Thr Gly Gly Glu Asn Ile Met Thr Tyr Lys Lys Leu Arg  
 675 680 685  
 Ile Tyr Ala Ile Thr Pro Asp Arg Glu Leu Leu Val Leu Ser Val  
 690 695 700  
 Asp  
 705

<210> 26  
 <211> 706  
 <212> PRT  
 <213> Clostridium perfringens

<400> 26  
 Glu Leu Asn Gly Asn Lys Thr Val Ile Pro Glu Glu Asn Leu Phe Phe  
 1 5 10 15  
 Arg Asp Tyr Ser Lys Ile Asp Glu Asn Asp Pro Phe Ile Pro Asn Asn  
 20 25 30  
 Asn Phe Phe Asp Val Arg Phe Phe Ser Ala Ala Trp Glu Asp Glu Asp  
 35 40 45  
 Leu Asp Thr Asp Asn Asp Asn Ile Pro Asp Ala Tyr Glu Lys Asn Gly  
 50 55 60  
 Tyr Thr Ile Lys Asp Ser Ile Ala Val Lys Trp Asn Asp Ser Phe Ala  
 65 70 75 80  
 Glu Gln Gly Tyr Lys Lys Tyr Val Ser Ser Tyr Leu Glu Ser Asn Thr  
 85 90 95  
 Ala Gly Asp Pro Tyr Thr Asp Tyr Gln Lys Ala Ser Gly Ser Ile Asp  
 100 105 110  
 Lys Ala Ile Lys Leu Glu Ala Arg Asp Pro Leu Val Ala Ala Tyr Pro  
 115 120 125  
 Val Val Gly Val Gly Met Glu Asn Leu Ile Ile Ser Thr Asn Glu His  
 130 135 140  
 Ala Ser Ser Asp Gln Gly Lys Thr Val Ser Arg Ala Thr Thr Asn Ser  
 145 150 155 160  
 Lys Thr Asp Ala Asn Thr Val Gly Val Ser Ile Ser Ala Gly Tyr Gln  
 165 170 175  
 Asn Gly Phe Thr Gly Asn Ile Thr Thr Ser Tyr Ser His Thr Thr Asp  
 180 185 190  
 Asn Ser Thr Ala Val Gln Asp Ser Asn Gly Glu Ser Trp Asn Thr Gly

195 200 205  
 Leu Ser Ile Asn Lys Gly Glu Ser Ala Tyr Ile Asn Ala Asn Val Arg  
 210 215 220  
 Tyr Tyr Asn Thr Gly Thr Ala Pro Met Tyr Lys Val Thr Pro Thr Thr  
 225 230 235 240  
 Asn Leu Val Leu Asp Gly Glu Thr Leu Ala Thr Ile Lys Ala Gln Asp  
 245 250 255  
 Asn Gln Ile Gly Asn Asn Leu Ser Pro Asn Glu Thr Tyr Pro Lys Lys  
 260 265 270  
 Gly Leu Ser Pro Leu Ala Leu Asn Thr Met Asp Gln Phe Asn Ala Arg  
 275 280 285  
 Leu Ile Pro Ile Asn Tyr Asp Gln Leu Lys Lys Leu Asp Ser Gly Lys  
 290 295 300  
 Gln Ile Lys Leu Glu Thr Thr Gln Val Ser Gly Asn Tyr Gly Thr Lys  
 305 310 315 320  
 Asn Ser Gln Gly Gln Ile Ile Thr Glu Gly Asn Ser Trp Ser Asn Tyr  
 325 330 335  
 Ile Ser Gln Ile Asp Ser Val Ser Ala Ser Ile Ile Leu Asp Thr Gly  
 340 345 350  
 Ser Gln Thr Phe Glu Arg Arg Val Ala Ala Lys Glu Gln Gly Asn Pro  
 355 360 365  
 Glu Asp Lys Thr Pro Glu Ile Thr Ile Gly Glu Ala Ile Lys Lys Ala  
 370 375 380  
 Phe Ser Ala Thr Lys Asn Gly Glu Leu Leu Tyr Phe Asn Gly Ile Pro  
 385 390 395 400  
 Ile Asp Glu Ser Cys Val Glu Leu Ile Phe Asp Asp Asn Thr Ser Glu  
 405 410 415  
 Ile Ile Lys Glu Gln Leu Lys Tyr Leu Asp Asp Lys Lys Ile Tyr Asn  
 420 425 430  
 Val Lys Leu Glu Arg Gly Met Asn Ile Leu Ile Lys Val Pro Ser Tyr  
 435 440 445  
 Phe Thr Asn Phe Asp Glu Tyr Asn Asn Phe Pro Ala Ser Trp Ser Asn  
 450 455 460  
 Ile Asp Thr Lys Asn Gln Asp Gly Leu Gln Ser Val Ala Asn Lys Leu  
 465 470 475 480  
 Ser Gly Glu Thr Lys Ile Ile Ile Pro Met Ser Lys Leu Lys Pro Tyr  
 485 490 495  
 Lys Arg Tyr Val Phe Ser Gly Tyr Ser Lys Asp Pro Ser Thr Ser Asn  
 500 505 510  
 Ser Ile Thr Val Asn Ile Lys Ser Lys Glu Gln Lys Thr Asp Tyr Leu  
 515 520 525  
 Val Pro Glu Lys Asp Tyr Thr Lys Phe Ser Tyr Glu Phe Glu Thr Thr  
 530 535 540  
 Gly Lys Asp Ser Ser Asp Ile Glu Ile Thr Leu Thr Ser Ser Gly Val  
 545 550 555 560  
 Ile Phe Leu Asp Asn Leu Ser Ile Thr Glu Leu Asn Ser Thr Pro Glu  
 565 570 575  
 Ile Leu Lys Glu Pro Glu Ile Lys Val Pro Ser Asp Gln Glu Ile Leu  
 580 585 590  
 Asp Ala His Asn Lys Tyr Tyr Ala Asp Ile Lys Leu Asp Thr Asn Thr  
 595 600 605  
 Gly Asn Thr Tyr Ile Asp Gly Ile Tyr Phe Glu Pro Thr Gln Thr Asn  
 610 615 620  
 Lys Glu Ala Leu Asp Tyr Ile Gln Lys Tyr Arg Val Glu Ala Thr Leu  
 625 630 635 640  
 Gln Tyr Ser Gly Phe Lys Asp Ile Gly Thr Lys Asp Lys Glu Ile Arg  
 645 650 655  
 Asn Tyr Leu Gly Asp Gln Asn Gln Pro Lys Thr Asn Tyr Ile Asn Phe  
 660 665 670

Arg Ser Tyr Phe Thr Ser Gly Glu Asn Val Met Thr Tyr Lys Lys Leu  
675 680 685  
Arg Ile Tyr Ala Val Thr Pro Asp Asn Arg Glu Leu Leu Val Leu Ser  
690 695 700  
Val Asn  
705

<210> 27  
<211> 712  
<212> PRT  
<213> Clostridium spiroforme

<400> 27  
Glu Leu Asn Gly Asp Lys Thr Leu Ile Pro Glu Lys Asn Leu Phe Leu  
1 5 10 15  
Arg Asp Tyr Ser Lys Ile Asp Glu Asn Asp Pro Phe Ile Pro Lys Asp  
20 25 30  
Asn Phe Phe Asp Leu Lys Leu Lys Ser Arg Ser Ala Arg Leu Ala Ser  
35 40 45  
Gly Trp Gly Asp Glu Asp Leu Asp Thr Asp Asn Asp Asn Ile Pro Asp  
50 55 60  
Ala Tyr Glu Lys Asn Gly Tyr Thr Ile Lys Asp Ser Ile Ala Val Lys  
65 70 75 80  
Trp Glu Asp Ser Phe Ala Gln Gln Gly Tyr Lys Lys Tyr Leu Ser Ser  
85 90 95  
Tyr Leu Glu Ser Asn Thr Ala Gly Asp Pro Tyr Thr Asp Tyr Gln Lys  
100 105 110  
Ala Ser Gly Ser Phe Asp Lys Ala Ile Lys Ala Glu Ala Arg Asp Pro  
115 120 125  
Leu Val Ala Ala Tyr Pro Val Val Gly Val Gly Met Glu Lys Leu Ile  
130 135 140  
Ile Ser Thr Asn Glu His Ala Ser Thr Asp Gln Gly Lys Thr Val Ser  
145 150 155 160  
Arg Asn Thr Thr Asn Ser Lys Thr Asp Ala Asn Thr Ala Gly Val Ala  
165 170 175  
Ile Asn Ile Ala Tyr Gln Asn Gly Phe Thr Gly Ser Ile Thr Thr Asn  
180 185 190  
Tyr Ser His Thr Thr Glu Asn Ser Thr Ala Val Gln Asn Ser Asn Gly  
195 200 205  
Glu Ser Trp Asn Thr Ser Leu Ser Ile Asn Lys Gly Glu Ser Ala Tyr  
210 215 220  
Ile Asn Ala Asn Val Arg Tyr Tyr Asn Thr Gly Thr Ala Pro Met Tyr  
225 230 235 240  
Lys Val Thr Pro Thr Thr Asn Leu Val Leu Asp Gly Asp Thr Leu Thr  
245 250 255  
Thr Ile Lys Ala Gln Asp Asn Gln Ile Gly Asn Asn Leu Ser Pro Asn  
260 265 270  
Glu Thr Tyr Pro Lys Lys Gly Leu Ser Pro Leu Ala Leu Asn Thr Met  
275 280 285  
Asp Gln Phe Ser Ser Arg Leu Ile Pro Ile Asn Tyr Asp Gln Leu Lys  
290 295 300  
Lys Leu Asp Ala Gly Lys Gln Ile Lys Leu Glu Thr Thr Gln Val Ser  
305 310 315 320  
Gly Asn Tyr Gly Ile Lys Asn Ser Gln Gly Gln Ile Ile Thr Glu Gly  
325 330 335  
Asn Ser Trp Ser Asp Tyr Ile Ser Gln Ile Asp Ser Leu Ser Ala Ser  
340 345 350  
Ile Ile Leu Asp Thr Gly Ser Asp Val Phe Glu Arg Arg Val Thr Ala

355 360 365  
 Lys Asp Ser Ser Asn Pro Glu Asp Lys Thr Pro Val Leu Thr Ile Gly  
 370 375 380  
 Glu Ala Ile Glu Lys Ala Phe Gly Ala Thr Lys Asn Gly Glu Ile Leu  
 385 390 395 400  
 Tyr Phe Asn Gly Met Pro Ile Asp Glu Ser Cys Val Glu Leu Ile Phe  
 405 410 415  
 Asp Gly Asn Thr Ala Asn Leu Ile Lys Glu Arg Leu Asn Ala Leu Asn  
 420 425 430  
 Asp Lys Lys Ile Tyr Asn Val Gln Leu Glu Arg Gly Met Lys Ile Leu  
 435 440 445  
 Ile Lys Thr Ser Thr Tyr Phe Asn Asn Phe Asp Gly Tyr Asn Asn Phe  
 450 455 460  
 Pro Ser Ser Trp Ser Asn Val Asp Ser Asn Asn Gln Asp Gly Leu Gln  
 465 470 475 480  
 Asn Ala Ala Asn Lys Leu Ser Gly Glu Thr Lys Ile Val Ile Pro Met  
 485 490 495  
 Ser Lys Leu Asn Pro Tyr Lys Arg Tyr Val Phe Ser Gly Tyr Leu Lys  
 500 505 510  
 Asn Ser Ser Thr Ser Asn Pro Ile Thr Val Asn Ile Lys Ala Lys Glu  
 515 520 525  
 Gln Lys Thr Tyr Asn Leu Val Ser Glu Asn Asp Tyr Lys Lys Phe Ser  
 530 535 540  
 Tyr Glu Phe Glu Thr Ile Gly Arg Asp Ala Ser Asn Ile Glu Ile Thr  
 545 550 555 560  
 Leu Thr Ser Ser Gly Thr Ile Phe Leu Asp Asn Leu Ser Ile Thr Glu  
 565 570 575  
 Leu Asn Ser Thr Pro Glu Ile Leu Lys Glu Pro Asp Ile Lys Val Pro  
 580 585 590  
 Ser Asp Gln Glu Ile Ile Asp Ala His Lys Lys Tyr Tyr Ala Asp Leu  
 595 600 605  
 Ser Phe Asn Gln Ser Thr Ala Asn Tyr Tyr Leu Asp Gly Leu Tyr Phe  
 610 615 620  
 Glu Pro Thr Gln Thr Asn Lys Glu Val Leu Asp Tyr Ile Gln Lys Tyr  
 625 630 635 640  
 Lys Val Glu Ala Thr Leu Glu Tyr Ser Gly Phe Lys Asp Ile Gly Thr  
 645 650 655  
 Lys Asp Lys Glu Leu Arg Asn Tyr Thr Gly Asp Ser Asn Gln Pro Lys  
 660 665 670  
 Thr Asn Tyr Val Asn Phe Arg Ser Tyr Phe Thr Ser Gly Glu Asn Val  
 675 680 685  
 Met Pro Tyr Lys Lys Leu Arg Ile Tyr Ala Ile Thr Pro Glu Asn Lys  
 690 695 700  
 Glu Leu Leu Val Leu Ser Ile Asn  
 705 710

<210> 28  
 <211> 582  
 <212> PRT  
 <213> Clostridium botulinum

<400> 28

Glu Thr Ser Asp Ile Ile Lys Glu Ile Ile Pro Ser Glu Val Leu Leu  
 1 5 10 15  
 Lys Pro Asn Tyr Ser Asn Thr Asn Glu Lys Ser Lys Phe Ile Pro Asn  
 20 25 30  
 Asn Thr Leu Phe Ser Asn Ala Lys Leu Lys Ala Asn Ala Asn Arg Asp  
 35 40 45

Thr Asp Arg Asp Gly Ile Pro Asp Glu Trp Glu Ile Asn Gly Tyr Thr  
 50 55 60  
 Val Met Asn Gln Lys Ala Val Ala Trp Asp Asp Lys Phe Ala Ala Asn  
 65 70 75 80  
 Gly Tyr Lys Lys Tyr Val Ser Asn Pro Phe Lys Pro Cys Thr Ala Asn  
 85 90 95  
 Asp Pro Tyr Thr Asp Phe Glu Lys Val Ser Gly Gln Ile Asp Pro Ser  
 100 105 110  
 Val Ser Met Val Ala Arg Asp Pro Met Ile Ser Ala Tyr Pro Ile Val  
 115 120 125  
 Gly Val Gln Met Glu Arg Leu Val Val Ser Lys Ser Glu Thr Ile Thr  
 130 135 140  
 Gly Asp Ser Thr Lys Ser Met Ser Lys Ser Thr Ser His Ser Ser Thr  
 145 150 155 160  
 Asn Ile Asn Thr Val Gly Ala Glu Val Ser Gly Ser Leu Gln Leu Ala  
 165 170 175  
 Gly Gly Ile Phe Pro Val Phe Ser Met Ser Ala Ser Ala Asn Tyr Ser  
 180 185 190  
 His Thr Trp Gln Asn Thr Ser Thr Val Asp Asp Thr Thr Gly Glu Ser  
 195 200 205  
 Phe Ser Gln Gly Leu Ser Ile Asn Thr Gly Glu Ser Ala Tyr Ile Asn  
 210 215 220  
 Pro Asn Ile Arg Tyr Tyr Asn Thr Gly Thr Ala Pro Val Tyr Asn Val  
 225 230 235 240  
 Thr Pro Thr Thr Thr Ile Val Ile Asp Lys Gln Ser Val Ala Thr Ile  
 245 250 255  
 Lys Gly Gln Glu Ser Leu Ile Gly Asp Tyr Leu Asn Pro Gly Gly Thr  
 260 265 270  
 Tyr Pro Ile Ile Gly Glu Pro Pro Met Ala Leu Asn Thr Met Asp Gln  
 275 280 285  
 Phe Ser Ser Arg Leu Ile Pro Ile Asn Tyr Asn Gln Leu Lys Ser Ile  
 290 295 300  
 Asp Asn Gly Gly Thr Val Met Leu Ser Thr Ser Gln Phe Thr Gly Asn  
 305 310 315 320  
 Phe Ala Lys Tyr Asn Ser Asn Gly Asn Leu Val Thr Asp Gly Asn Asn  
 325 330 335  
 Trp Gly Pro Tyr Leu Gly Thr Ile Lys Ser Thr Thr Ala Ser Leu Thr  
 340 345 350  
 Leu Ser Phe Ser Gly Gln Thr Thr Gln Val Ala Val Val Ala Pro Asn  
 355 360 365  
 Phe Ser Asp Pro Glu Asp Lys Thr Pro Lys Leu Thr Leu Glu Gln Ala  
 370 375 380  
 Leu Val Lys Ala Phe Ala Leu Glu Lys Lys Asn Gly Lys Phe Tyr Phe  
 385 390 395 400  
 His Gly Leu Glu Ile Ser Lys Asn Glu Lys Ile Gln Val Phe Leu Asp  
 405 410 415  
 Ser Asn Thr Asn Asn Asp Phe Glu Asn Gln Leu Lys Asn Thr Ala Asp  
 420 425 430  
 Lys Asp Ile Met His Cys Ile Ile Lys Arg Asn Met Asn Ile Leu Val  
 435 440 445  
 Lys Val Ile Thr Phe Lys Glu Asn Ile Ser Ser Ile Asn Ile Ile Asn  
 450 455 460  
 Asp Thr Asn Phe Gly Val Gln Ser Met Thr Gly Leu Ser Asn Arg Ser  
 465 470 475 480  
 Lys Gly Gln Asp Gly Ile Tyr Arg Ala Ala Thr Thr Ala Phe Ser Phe  
 485 490 495  
 Lys Ser Lys Glu Leu Lys Tyr Pro Glu Gly Arg Tyr Arg Met Arg Phe  
 500 505 510  
 Val Ile Gln Ser Tyr Glu Pro Phe Thr Cys Asn Phe Lys Leu Phe Asn

	515		520		525										
Asn	Leu	Ile	Tyr	Ser	Ser	Ser	Phe	Asp	Lys	Gly	Tyr	Tyr	Asp	Glu	Phe
	530				535						540				
Phe	Tyr	Phe	Tyr	Tyr	Asn	Gly	Ser	Lys	Ser	Phe	Phe	Asn	Ile	Ser	Cys
545					550					555					560
Asp	Ile	Ile	Asn	Ser	Ile	Asn	Arg	Leu	Ser	Gly	Val	Phe	Leu	Ile	Glu
				565					570						575
Leu	Asp	Lys	Leu	Ile	Ile										
				580											

<210> 29  
 <211> 708  
 <212> PRT  
 <213> Bacillus cereus

C2

<400> 29															
Ile	Asp	Ser	Gln	Asn	Gln	Pro	Gln	Gln	Val	Gln	Gln	Asp	Glu	Leu	Arg
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Asn	Pro	Glu	Phe	Asn	Lys	Lys	Glu	Ser	Gln	Glu	Phe	Leu	Ala	Lys	Pro
			20				25						30		
Ser	Lys	Ile	Asn	Leu	Phe	Thr	Gln	Gln	Met	Lys	Arg	Glu	Ile	Asp	Glu
		35					40					45			
Asp	Thr	Asp	Thr	Asp	Gly	Asp	Ser	Ile	Pro	Asp	Leu	Trp	Glu	Glu	Asn
	50					55					60				
Gly	Tyr	Thr	Ile	Gln	Asn	Arg	Ile	Ala	Val	Lys	Trp	Asp	Asp	Ser	Leu
65				70					75						80
Ala	Ser	Lys	Gly	Tyr	Thr	Lys	Phe	Val	Ser	Asn	Pro	Leu	Glu	Ser	His
				85					90					95	
Thr	Val	Gly	Asp	Pro	Tyr	Thr	Asp	Tyr	Glu	Lys	Ala	Ala	Arg	Asp	Leu
			100					105					110		
Asp	Leu	Ser	Asn	Ala	Lys	Glu	Thr	Phe	Asn	Pro	Leu	Val	Ala	Ala	Phe
	115						120					125			
Pro	Ser	Val	Asn	Val	Ser	Met	Glu	Lys	Val	Ile	Leu	Ser	Pro	Asn	Glu
	130					135					140				
Asn	Leu	Ser	Asn	Ser	Val	Glu	Ser	His	Ser	Ser	Thr	Asn	Trp	Ser	Tyr
145					150					155					160
Thr	Asn	Thr	Glu	Gly	Ala	Ser	Val	Glu	Ala	Gly	Ile	Gly	Pro	Lys	Gly
				165					170					175	
Ile	Ser	Phe	Gly	Val	Ser	Val	Asn	Tyr	Gln	His	Ser	Glu	Thr	Val	Ala
			180					185					190		
Gln	Glu	Trp	Gly	Thr	Ser	Thr	Gly	Asn	Thr	Ser	Gln	Phe	Asn	Thr	Ala
	195						200					205			
Ser	Ala	Gly	Tyr	Leu	Asn	Ala	Asn	Val	Arg	Tyr	Asn	Asn	Val	Gly	Thr
	210					215					220				
Gly	Ala	Ile	Tyr	Asp	Val	Lys	Pro	Thr	Thr	Ser	Phe	Val	Leu	Asn	Asn
225					230					235					240
Asp	Thr	Ile	Ala	Thr	Ile	Thr	Ala	Lys	Ser	Asn	Ser	Thr	Ala	Leu	Asn
				245					250					255	
Ile	Ser	Pro	Gly	Glu	Ser	Tyr	Pro	Lys	Lys	Gly	Gln	Asn	Gly	Ile	Ala
			260					265					270		
Ile	Thr	Ser	Met	Asp	Asp	Phe	Asn	Ser	His	Pro	Ile	Thr	Leu	Asn	Lys
		275					280					285			
Lys	Gln	Val	Asp	Asn	Leu	Leu	Asn	Asn	Lys	Pro	Met	Met	Leu	Glu	Thr
	290					295					300				
Asn	Gln	Thr	Asp	Gly	Val	Tyr	Lys	Ile	Lys	Asp	Thr	His	Gly	Asn	Ile
305					310					315					320
Val	Thr	Gly	Gly	Glu	Trp	Asn	Gly	Val	Ile	Gln	Gln	Ile	Lys	Ala	Lys
				325					330					335	

Thr Ala Ser Ile Ile Val Asp Asp Gly Glu Arg Val Ala Glu Lys Arg  
 340 345 350  
 Val Ala Ala Lys Asp Tyr Glu Asn Pro Glu Asp Lys Thr Pro Ser Leu  
 355 360 365  
 Thr Leu Lys Asp Ala Leu Lys Leu Ser Tyr Pro Asp Glu Ile Lys Glu  
 370 375 380  
 Ile Glu Gly Leu Leu Tyr Tyr Lys Asn Lys Pro Ile Tyr Glu Ser Ser  
 385 390 395 400  
 Val Met Thr Tyr Leu Asp Glu Asn Thr Ala Lys Glu Val Thr Lys Gln  
 405 410 415  
 Leu Asn Asp Thr Thr Gly Lys Phe Lys Asp Val Ser His Leu Tyr Asp  
 420 425 430  
 Val Lys Leu Thr Pro Lys Met Asn Val Thr Ile Lys Leu Ser Ile Leu  
 435 440 445  
 Tyr Asp Asn Ala Glu Ser Asn Asp Asn Ser Ile Gly Lys Trp Thr Asn  
 450 455 460  
 Thr Asn Ile Val Ser Gly Gly Asn Asn Gly Lys Lys Gln Tyr Ser Ser  
 465 470 475 480  
 Asn Asn Pro Asp Ala Asn Leu Thr Leu Asn Thr Asp Ala Gln Glu Lys  
 485 490 495  
 Leu Asn Lys Asn Arg Asp Tyr Tyr Ile Ser Leu Tyr Met Lys Ser Glu  
 500 505 510  
 Lys Asn Thr Gln Cys Glu Ile Thr Ile Asp Gly Glu Ile Tyr Pro Ile  
 515 520 525  
 Thr Thr Lys Thr Val Asn Val Asn Lys Asp Asn Tyr Lys Arg Leu Asp  
 530 535 540  
 Ile Ile Ala His Asn Ile Lys Ser Asn Pro Ile Ser Ser Leu His Ile  
 545 550 555 560  
 Lys Thr Asn Asp Glu Ile Thr Leu Phe Trp Asp Asp Ile Ser Ile Thr  
 565 570 575  
 Asp Val Ala Ser Ile Lys Pro Glu Asn Leu Thr Asp Ser Glu Ile Lys  
 580 585 590  
 Gln Ile Tyr Ser Arg Tyr Gly Ile Lys Leu Glu Asp Gly Ile Leu Ile  
 595 600 605  
 Asp Lys Lys Gly Gly Ile His Tyr Gly Glu Phe Ile Asn Glu Ala Ser  
 610 615 620  
 Phe Asn Ile Glu Pro Leu Gln Asn Tyr Val Thr Lys Tyr Glu Val Thr  
 625 630 635 640  
 Tyr Ser Ser Glu Leu Gly Pro Asn Val Ser Asp Thr Leu Glu Ser Asp  
 645 650 655  
 Lys Ile Tyr Lys Asp Gly Thr Ile Lys Phe Asp Phe Thr Lys Tyr Ser  
 660 665 670  
 Lys Asn Glu Gln Gly Leu Phe Tyr Asp Ser Gly Leu Asn Trp Asp Phe  
 675 680 685  
 Lys Ile Asn Ala Ile Thr Tyr Asp Gly Lys Glu Met Asn Val Phe His  
 690 695 700  
 Arg Tyr Asn Lys  
 705

<210> 30

<211> 735

<212> PRT

<213> Bacillus anthracis

<400> 30

Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
 1 5 10 15  
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro



20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Gln Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495

Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Val Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly  
 725 730 735

<210> 31  
 <211> 876  
 <212> PRT  
 <213> Clostridium difficile

<400> 31  
 Met Lys Ile Gln Met Arg Asn Lys Lys Val Leu Ser Phe Leu Thr Leu  
 1 5 10 15  
 Thr Ala Ile Val Ser Gln Ala Leu Val Tyr Pro Val Tyr Ala Gln Thr  
 20 25 30  
 Ser Thr Ser Asn His Ser Asn Lys Lys Glu Ile Val Asn Glu Asp  
 35 40 45  
 Ile Leu Pro Asn Asn Gly Leu Met Gly Tyr Tyr Phe Ser Asp Glu His  
 50 55 60  
 Phe Lys Asp Leu Lys Leu Met Ala Pro Ile Lys Asp Gly Asn Leu Lys  
 65 70 75 80  
 Phe Glu Glu Lys Lys Val Asp Lys Leu Leu Asp Lys Asp Lys Ser Asp  
 85 90 95  
 Val Lys Ser Ile Arg Trp Thr Gly Arg Ile Ile Pro Ser Lys Asp Gly  
 100 105 110  
 Glu Tyr Thr Leu Ser Thr Asp Arg Asp Val Leu Met Gln Val Asn  
 115 120 125  
 Thr Glu Ser Thr Ile Ser Asn Thr Leu Lys Val Asn Met Lys Lys Gly  
 130 135 140  
 Lys Glu Tyr Lys Val Arg Ile Glu Leu Gln Asp Lys Asn Leu Gly Ser  
 145 150 155 160  
 Ile Asp Asn Leu Ser Ser Pro Asn Leu Tyr Trp Glu Leu Asp Gly Met

165 170 175  
 Lys Lys Ile Ile Pro Glu Glu Asn Leu Phe Leu Arg Asp Tyr Ser Asn  
 180 185 190  
 Ile Glu Lys Asp Asp Pro Phe Ile Pro Asn Asn Asn Phe Phe Asp Pro  
 195 200 205  
 Lys Leu Met Ser Asp Trp Glu Asp Glu Asp Leu Asp Thr Asp Asn Asp  
 210 215 220  
 Asn Ile Pro Asp Ser Tyr Glu Arg Asn Gly Tyr Thr Ile Lys Asp Leu  
 225 230 235 240  
 Ile Ala Val Lys Trp Glu Asp Ser Phe Ala Glu Gln Gly Tyr Lys Lys  
 245 250 255  
 Tyr Val Ser Asn Tyr Leu Glu Ser Asn Thr Ala Gly Asp Pro Tyr Thr  
 260 265 270  
 Asp Tyr Glu Lys Ala Ser Gly Ser Phe Asp Lys Ala Ile Lys Thr Glu  
 275 280 285  
 Ala Arg Asp Pro Leu Val Ala Ala Tyr Pro Ile Val Gly Val Gly Met  
 290 295 300  
 Glu Lys Leu Ile Ile Ser Thr Asn Glu His Ala Ser Thr Asp Gln Gly  
 305 310 315 320  
 Lys Thr Val Ser Arg Ala Thr Thr Asn Ser Lys Thr Glu Ser Asn Thr  
 325 330 335  
 Ala Gly Val Ser Val Asn Val Gly Tyr Gln Asn Gly Phe Thr Ala Asn  
 340 345 350  
 Val Thr Thr Asn Tyr Ser His Thr Thr Asp Asn Ser Thr Ala Val Gln  
 355 360 365  
 Asp Ser Asn Gly Glu Ser Trp Asn Thr Gly Leu Ser Ile Asn Lys Gly  
 370 375 380  
 Glu Ser Ala Tyr Ile Asn Ala Asn Val Arg Tyr Tyr Asn Thr Gly Thr  
 385 390 395 400  
 Ala Pro Met Tyr Lys Val Thr Pro Thr Thr Asn Leu Val Leu Asp Gly  
 405 410 415  
 Asp Thr Leu Ser Thr Ile Lys Ala Gln Glu Asn Gln Ile Gly Asn Asn  
 420 425 430  
 Leu Ser Pro Gly Asp Thr Tyr Pro Lys Lys Gly Leu Ser Pro Leu Ala  
 435 440 445  
 Leu Asn Thr Met Asp Gln Phe Ser Ser Arg Leu Ile Pro Ile Asn Tyr  
 450 455 460  
 Asp Gln Leu Lys Lys Leu Asp Ala Gly Lys Gln Ile Lys Leu Glu Thr  
 465 470 475 480  
 Thr Gln Val Ser Gly Asn Phe Gly Thr Lys Asn Ser Ser Gly Gln Ile  
 485 490 495  
 Val Thr Glu Gly Asn Ser Trp Ser Asp Tyr Ile Ser Gln Ile Asp Ser  
 500 505 510  
 Ile Ser Ala Ser Ile Ile Leu Asp Thr Glu Asn Glu Ser Tyr Glu Arg  
 515 520 525  
 Arg Val Thr Ala Lys Asn Leu Gln Asp Pro Glu Asp Lys Thr Pro Glu  
 530 535 540  
 Leu Thr Ile Gly Glu Ala Ile Glu Lys Ala Phe Gly Ala Thr Lys Lys  
 545 550 555 560  
 Asp Gly Leu Leu Tyr Phe Asn Asp Ile Pro Ile Asp Glu Ser Cys Val  
 565 570 575  
 Glu Leu Ile Phe Asp Asp Asn Thr Ala Asn Lys Ile Lys Asp Ser Leu  
 580 585 590  
 Lys Thr Leu Ser Asp Lys Lys Ile Tyr Asn Val Lys Leu Glu Arg Gly  
 595 600 605  
 Met Asn Ile Leu Ile Lys Thr Pro Thr Tyr Phe Thr Asn Phe Asp Asp  
 610 615 620  
 Tyr Asn Asn Tyr Pro Ser Thr Trp Ser Asn Val Asn Thr Thr Asn Gln  
 625 630 635 640

Asp Gly Leu Gln Gly Ser Ala Asn Lys Leu Asn Gly Glu Thr Lys Ile  
 645 650 655  
 Lys Ile Pro Met Ser Glu Leu Lys Pro Tyr Lys Arg Tyr Val Phe Ser  
 660 665 670  
 Gly Tyr Ser Lys Asp Pro Leu Thr Ser Asn Ser Ile Ile Val Lys Ile  
 675 680 685  
 Lys Ala Lys Glu Glu Lys Thr Asp Tyr Leu Val Pro Glu Gln Gly Tyr  
 690 695 700  
 Thr Lys Phe Ser Tyr Glu Phe Glu Thr Thr Glu Lys Asp Ser Ser Asn  
 705 710 715 720  
 Ile Glu Ile Thr Leu Ile Gly Ser Gly Thr Thr Tyr Leu Asp Asn Leu  
 725 730 735  
 Ser Ile Thr Glu Leu Asn Ser Thr Pro Glu Ile Leu Asp Glu Pro Glu  
 740 745 750  
 Val Lys Ile Pro Thr Asp Gln Glu Ile Met Asp Ala His Lys Ile Tyr  
 755 760 765  
 Phe Ala Asp Leu Asn Phe Asn Pro Ser Thr Gly Asn Thr Tyr Ile Asn  
 770 775 780  
 Gly Met Tyr Phe Ala Pro Thr Gln Thr Asn Lys Glu Ala Leu Asp Tyr  
 785 790 795 800  
 Ile Gln Lys Tyr Arg Val Glu Ala Thr Leu Gln Tyr Ser Gly Phe Lys  
 805 810 815  
 Asp Ile Gly Thr Lys Asp Lys Glu Met Arg Asn Tyr Leu Gly Asp Pro  
 820 825 830  
 Asn Gln Pro Lys Thr Asn Tyr Val Asn Leu Arg Ser Tyr Phe Thr Gly  
 835 840 845  
 Gly Glu Asn Ile Met Thr Tyr Lys Lys Leu Arg Ile Tyr Ala Ile Thr  
 850 855 860  
 Pro Asp Asp Arg Glu Leu Leu Val Leu Ser Val Asp  
 865 870 875

<210> 32  
 <211> 875  
 <212> PRT  
 <213> Clostridium perfringens

<400> 32  
 Met Asn Ile Gln Ile Lys Asn Val Phe Ser Phe Leu Thr Leu Thr Ala  
 1 5 10 15  
 Met Ile Ser Gln Thr Leu Ser Tyr Asn Val Tyr Ala Gln Thr Thr Thr  
 20 25 30  
 Gln Asn Asp Thr Asn Gln Lys Glu Ile Thr Asn Glu Asn Thr Leu  
 35 40 45  
 Ser Ser Asn Gly Leu Met Gly Tyr Tyr Phe Ala Asp Glu His Phe Lys  
 50 55 60  
 Asp Leu Glu Leu Met Ala Pro Ile Lys Asn Gly Asp Leu Lys Phe Glu  
 65 70 75 80  
 Glu Lys Lys Val Asp Lys Leu Leu Thr Glu Asp Asn Ser Ser Ile Lys  
 85 90 95  
 Ser Ile Arg Trp Thr Gly Arg Ile Ile Pro Ser Glu Asp Gly Glu Tyr  
 100 105 110  
 Ile Leu Ser Thr Asp Arg Asn Asp Val Leu Met Gln Ile Asn Ala Lys  
 115 120 125  
 Gly Asp Ile Ala Lys Thr Leu Lys Val Asn Met Lys Lys Gly Gln Ala  
 130 135 140  
 Tyr Asn Ile Arg Ile Glu Ile Gln Asp Lys Asn Leu Gly Ser Ile Asp  
 145 150 155 160  
 Asn Leu Ser Val Pro Lys Leu Tyr Trp Glu Leu Asn Gly Asn Lys Thr

165 170 175  
 Val Ile Pro Glu Glu Asn Leu Phe Phe Arg Asp Tyr Ser Lys Ile Asp  
 180 185 190  
 Glu Asn Asp Pro Phe Ile Pro Asn Asn Asn Phe Phe Asp Val Arg Phe  
 195 200 205  
 Phe Ser Ala Ala Trp Glu Asp Glu Asp Leu Asp Thr Asp Asn Asp Asn  
 210 215 220  
 Ile Pro Asp Ala Tyr Glu Lys Asn Gly Tyr Thr Ile Lys Asp Ser Ile  
 225 230 235 240  
 Ala Val Lys Trp Asn Asp Ser Phe Ala Glu Gln Gly Tyr Lys Lys Tyr  
 245 250 255  
 Val Ser Ser Tyr Leu Glu Ser Asn Thr Ala Gly Asp Pro Tyr Thr Asp  
 260 265 270  
 Tyr Gln Lys Ala Ser Gly Ser Ile Asp Lys Ala Ile Lys Leu Glu Ala  
 275 280 285  
 Arg Asp Pro Leu Val Ala Ala Tyr Pro Val Val Gly Val Gly Met Glu  
 290 295 300  
 Asn Leu Ile Ile Ser Thr Asn Glu His Ala Ser Ser Asp Gln Gly Lys  
 305 310 315 320  
 Thr Val Ser Arg Ala Thr Thr Asn Ser Lys Thr Asp Ala Asn Thr Val  
 325 330 335  
 Gly Val Ser Ile Ser Ala Gly Tyr Gln Asn Gly Phe Thr Gly Asn Ile  
 340 345 350  
 Thr Thr Ser Tyr Ser His Thr Thr Asp Asn Ser Thr Ala Val Gln Asp  
 355 360 365  
 Ser Asn Gly Glu Ser Trp Asn Thr Gly Leu Ser Ile Asn Lys Gly Glu  
 370 375 380  
 Ser Ala Tyr Ile Asn Ala Asn Val Arg Tyr Tyr Asn Thr Gly Thr Ala  
 385 390 395 400  
 Pro Met Tyr Lys Val Thr Pro Thr Thr Asn Leu Val Leu Asp Gly Glu  
 405 410 415  
 Thr Leu Ala Thr Ile Lys Ala Gln Asp Asn Gln Ile Gly Asn Asn Leu  
 420 425 430  
 Ser Pro Asn Glu Thr Tyr Pro Lys Lys Gly Leu Ser Pro Leu Ala Leu  
 435 440 445  
 Asn Thr Met Asp Gln Phe Asn Ala Arg Leu Ile Pro Ile Asn Tyr Asp  
 450 455 460  
 Gln Leu Lys Lys Leu Asp Ser Gly Lys Gln Ile Lys Leu Glu Thr Thr  
 465 470 475 480  
 Gln Val Ser Gly Asn Tyr Gly Thr Lys Asn Ser Gln Gly Gln Ile Ile  
 485 490 495  
 Thr Glu Gly Asn Ser Trp Ser Asn Tyr Ile Ser Gln Ile Asp Ser Val  
 500 505 510  
 Ser Ala Ser Ile Ile Leu Asp Thr Gly Ser Gln Thr Phe Glu Arg Arg  
 515 520 525  
 Val Ala Ala Lys Glu Gln Gly Asn Pro Glu Asp Lys Thr Pro Glu Ile  
 530 535 540  
 Thr Ile Gly Glu Ala Ile Lys Lys Ala Phe Ser Ala Thr Lys Asn Gly  
 545 550 555 560  
 Glu Leu Leu Tyr Phe Asn Gly Ile Pro Ile Asp Glu Ser Cys Val Glu  
 565 570 575  
 Leu Ile Phe Asp Asp Asn Thr Ser Glu Ile Ile Lys Glu Gln Leu Lys  
 580 585 590  


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 Tyr Leu Asp Asp Lys Lys Ile Tyr Asn Val Lys Leu Glu Arg Gly Met  
 595 600 605  
 Asn Ile Leu Ile Lys Val Pro Ser Tyr Phe Thr Asn Phe Asp Glu Tyr  
 610 615 620  
 Asn Asn Phe Pro Ala Ser Trp Ser Asn Ile Asp Thr Lys Asn Gln Asp  
 625 630 635 640

Gly Leu Gln Ser Val Ala Asn Lys Leu Ser Gly Glu Thr Lys Ile Ile  
 645 650 655  
 Ile Pro Met Ser Lys Leu Lys Pro Tyr Lys Arg Tyr Val Phe Ser Gly  
 660 665 670  
 Tyr Ser Lys Asp Pro Ser Thr Ser Asn Ser Ile Thr Val Asn Ile Lys  
 675 680 685  
 Ser Lys Glu Gln Lys Thr Asp Tyr Leu Val Pro Glu Lys Asp Tyr Thr  
 690 695 700  
 Lys Phe Ser Tyr Glu Phe Glu Thr Thr Gly Lys Asp Ser Ser Asp Ile  
 705 710 715 720  
 Glu Ile Thr Leu Thr Ser Ser Gly Val Ile Phe Leu Asp Asn Leu Ser  
 725 730 735  
 Ile Thr Glu Leu Asn Ser Thr Pro Glu Ile Leu Lys Glu Pro Glu Ile  
 740 745 750  
 Lys Val Pro Ser Asp Gln Glu Ile Leu Asp Ala His Asn Lys Tyr Tyr  
 755 760 765  
 Ala Asp Ile Lys Leu Asp Thr Asn Thr Gly Asn Thr Tyr Ile Asp Gly  
 770 775 780  
 Ile Tyr Phe Glu Pro Thr Gln Thr Asn Lys Glu Ala Leu Asp Tyr Ile  
 785 790 795 800  
 Gln Lys Tyr Arg Val Glu Ala Thr Leu Gln Tyr Ser Gly Phe Lys Asp  
 805 810 815  
 Ile Gly Thr Lys Asp Lys Glu Ile Arg Asn Tyr Leu Gly Asp Gln Asn  
 820 825 830  
 Gln Pro Lys Thr Asn Tyr Ile Asn Phe Arg Ser Tyr Phe Thr Ser Gly  
 835 840 845  
 Glu Asn Val Met Thr Tyr Lys Lys Leu Arg Ile Tyr Ala Val Thr Pro  
 850 855 860  
 Asp Asn Arg Glu Leu Leu Val Leu Ser Val Asn  
 865 870 875

<210> 33  
 <211> 879  
 <212> PRT  
 <213> Clostridium spiroforme

<400> 33  
 Met Lys Asn Lys Lys Ile Leu Gly Leu Leu Thr Cys Thr Val Leu Val  
 1 5 10 15  
 Gly Gln Met Met Thr Tyr Pro Val Tyr Ala Lys Thr Ile Thr Gln Asn  
 20 25 30  
 Tyr Asp Asn Gln Glu Val Glu Thr Thr Asn Glu Lys Thr Val Ser Ser  
 35 40 45  
 Asn Gly Leu Met Gly Tyr Tyr Phe Ala Asp Glu His Phe Lys Asp Leu  
 50 55 60  
 Glu Leu Met Ala Pro Val Lys Asn Gly Glu Leu Lys Phe Glu Lys Asn  
 65 70 75 80  
 Lys Val Glu Lys Leu Leu Thr Glu Glu Lys Thr Asn Ile Lys Ser Ile  
 85 90 95  
 Arg Trp Thr Gly Arg Ile Ile Pro Ser Lys Asp Gly Glu Tyr Thr Leu  
 100 105 110  
 Ser Thr Asp Lys Asp Asn Val Leu Met Gln Ile Asn Ala Glu Gly Glu  
 115 120 125  
 Ile Ala Asn Thr Leu Lys Val Asn Met Ile Lys Gly Gln Glu Tyr Ser  
 130 135 140  
 Ile Arg Ile Glu Ile Gln Asp Lys Asp Ile Gly Tyr Val Asp Asp Leu  
 145 150 155 160  
 Ser Ser Pro Lys Leu Tyr Trp Glu Leu Asn Gly Asp Lys Thr Leu Ile

165 170 175  
 Pro Glu Lys Asn Leu Phe Leu Arg Asp Tyr Ser Lys Ile Asp Glu Asn  
 180 185 190  
 Asp Pro Phe Ile Pro Lys Asp Asn Phe Phe Asp Leu Lys Leu Lys Ser  
 195 200 205  
 Arg Ser Ala Arg Leu Ala Ser Gly Trp Gly Asp Glu Asp Leu Asp Thr  
 210 215 220  
 Asp Asn Asp Asn Ile Pro Asp Ala Tyr Glu Lys Asn Gly Tyr Thr Ile  
 225 230 235 240  
 Lys Asp Ser Ile Ala Val Lys Trp Glu Asp Ser Phe Ala Gln Gln Gly  
 245 250 255  
 Tyr Lys Lys Tyr Leu Ser Ser Tyr Leu Glu Ser Asn Thr Ala Gly Asp  
 260 265 270  
 Pro Tyr Thr Asp Tyr Gln Lys Ala Ser Gly Ser Phe Asp Lys Ala Ile  
 275 280 285  
 Lys Ala Glu Ala Arg Asp Pro Leu Val Ala Ala Tyr Pro Val Val Gly  
 290 295 300  
 Val Gly Met Glu Lys Leu Ile Ile Ser Thr Asn Glu His Ala Ser Thr  
 305 310 315 320  
 Asp Gln Gly Lys Thr Val Ser Arg Asn Thr Thr Asn Ser Lys Thr Asp  
 325 330 335  
 Ala Asn Thr Ala Gly Val Ala Ile Asn Ile Ala Tyr Gln Asn Gly Phe  
 340 345 350  
 Thr Gly Ser Ile Thr Thr Asn Tyr Ser His Thr Thr Glu Asn Ser Thr  
 355 360 365  
 Ala Val Gln Asn Ser Asn Gly Glu Ser Trp Asn Thr Ser Leu Ser Ile  
 370 375 380  
 Asn Lys Gly Glu Ser Ala Tyr Ile Asn Ala Asn Val Arg Tyr Tyr Asn  
 385 390 395 400  
 Thr Gly Thr Ala Pro Met Tyr Lys Val Thr Pro Thr Thr Asn Leu Val  
 405 410 415  
 Leu Asp Gly Asp Thr Leu Thr Thr Ile Lys Ala Gln Asp Asn Gln Ile  
 420 425 430  
 Gly Asn Asn Leu Ser Pro Asn Glu Thr Tyr Pro Lys Lys Gly Leu Ser  
 435 440 445  
 Pro Leu Ala Leu Asn Thr Met Asp Gln Phe Ser Ser Arg Leu Ile Pro  
 450 455 460  
 Ile Asn Tyr Asp Gln Leu Lys Lys Leu Asp Ala Gly Lys Gln Ile Lys  
 465 470 475 480  
 Leu Glu Thr Thr Gln Val Ser Gly Asn Tyr Gly Ile Lys Asn Ser Gln  
 485 490 495  
 Gly Gln Ile Ile Thr Glu Gly Asn Ser Trp Ser Asp Tyr Ile Ser Gln  
 500 505 510  
 Ile Asp Ser Leu Ser Ala Ser Ile Ile Leu Asp Thr Gly Ser Asp Val  
 515 520 525  
 Phe Glu Arg Arg Val Thr Ala Lys Asp Ser Ser Asn Pro Glu Asp Lys  
 530 535 540  
 Thr Pro Val Leu Thr Ile Gly Glu Ala Ile Glu Lys Ala Phe Gly Ala  
 545 550 555 560  
 Thr Lys Asn Gly Glu Ile Leu Tyr Phe Asn Gly Met Pro Ile Asp Glu  
 565 570 575  
 Ser Cys Val Glu Leu Ile Phe Asp Gly Asn Thr Ala Asn Leu Ile Lys  
 580 585 590  
 Glu Arg Leu Asn Ala Leu Asn Asp Lys Lys Ile Tyr Asn Val Gln Leu  
 595 600 605  
 Glu Arg Gly Met Lys Ile Leu Ile Lys Thr Ser Thr Tyr Phe Asn Asn  
 610 615 620  
 Phe Asp Gly Tyr Asn Asn Phe Pro Ser Ser Trp Ser Asn Val Asp Ser  
 625 630 635 640

Asn Asn Gln Asp Gly Leu Gln Asn Ala Ala Asn Lys Leu Ser Gly Glu  
 645 650 655  
 Thr Lys Ile Val Ile Pro Met Ser Lys Leu Asn Pro Tyr Lys Arg Tyr  
 660 665 670  
 Val Phe Ser Gly Tyr Leu Lys Asn Ser Ser Thr Ser Asn Pro Ile Thr  
 675 680 685  
 Val Asn Ile Lys Ala Lys Glu Gln Lys Thr Tyr Asn Leu Val Ser Glu  
 690 695 700  
 Asn Asp Tyr Lys Lys Phe Ser Tyr Glu Phe Glu Thr Ile Gly Arg Asp  
 705 710 715 720  
 Ala Ser Asn Ile Glu Ile Thr Leu Thr Ser Ser Gly Thr Ile Phe Leu  
 725 730 735  
 Asp Asn Leu Ser Ile Thr Glu Leu Asn Ser Thr Pro Glu Ile Leu Lys  
 740 745 750  
 Glu Pro Asp Ile Lys Val Pro Ser Asp Gln Glu Ile Ile Asp Ala His  
 755 760 765  
 Lys Lys Tyr Tyr Ala Asp Leu Ser Phe Asn Gln Ser Thr Ala Asn Tyr  
 770 775 780  
 Tyr Leu Asp Gly Leu Tyr Phe Glu Pro Thr Gln Thr Asn Lys Glu Val  
 785 790 795 800  
 Leu Asp Tyr Ile Gln Lys Tyr Lys Val Glu Ala Thr Leu Glu Tyr Ser  
 805 810 815  
 Gly Phe Lys Asp Ile Gly Thr Lys Asp Lys Glu Leu Arg Asn Tyr Thr  
 820 825 830  
 Gly Asp Ser Asn Gln Pro Lys Thr Asn Tyr Val Asn Phe Arg Ser Tyr  
 835 840 845  
 Phe Thr Ser Gly Glu Asn Val Met Pro Tyr Lys Lys Leu Arg Ile Tyr  
 850 855 860  
 Ala Ile Thr Pro Glu Asn Lys Glu Leu Leu Val Leu Ser Ile Asn  
 865 870 875

<210> 34  
 <211> 721  
 <212> PRT  
 <213> Clostridium botulinum

<400> 34  
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 Tyr Phe Thr Ile Asn Gly Leu Met Gly Tyr Tyr Phe Glu Asn Asp Phe  
 20 25 30  
 Phe Asn Leu Asn Ile Ile Ser Pro Thr Leu Asp Gly Asn Leu Thr Phe  
 35 40 45  
 Ser Lys Glu Asp Ile Asn Ser Ile Leu Gly Asn Lys Ile Ile Lys Ser  
 50 55 60  
 Ala Arg Trp Ile Gly Leu Ile Lys Pro Ser Ile Thr Gly Glu Tyr Ile  
 65 70 75 80  
 Leu Ser Thr Asn Ser Pro Asn Cys Arg Val Glu Leu Asn Gly Glu Ile  
 85 90 95  
 Phe Asn Leu Ser Leu Asn Thr Ser Asn Thr Val Asn Leu Ile Gln Gly  
 100 105 110  
 Asn Val Tyr Asp Ile Arg Ile Glu Gln Leu Met Ser Glu Asn Gln Leu  
 115 120 125  
 Leu Lys Asn Tyr Glu Gly Ile Lys Leu Tyr Trp Glu Thr Ser Asp Ile  
 130 135 140  
 Ile Lys Glu Ile Ile Pro Ser Glu Val Leu Leu Lys Pro Asn Tyr Ser  
 145 150 155 160  
 Asn Thr Asn Glu Lys Ser Lys Phe Ile Pro Asn Asn Thr Leu Phe Ser



165 170 175  
 Asn Ala Lys Leu Lys Ala Asn Ala Asn Arg Asp Thr Asp Arg Asp Gly  
 180 185 190  
 Ile Pro Asp Glu Trp Glu Ile Asn Gly Tyr Thr Val Met Asn Gln Lys  
 195 200 205  
 Ala Val Ala Trp Asp Asp Lys Phe Ala Ala Asn Gly Tyr Lys Lys Tyr  
 210 215 220  
 Val Ser Asn Pro Phe Lys Pro Cys Thr Ala Asn Asp Pro Tyr Thr Asp  
 225 230 235 240  
 Phe Glu Lys Val Ser Gly Gln Ile Asp Pro Ser Val Ser Met Val Ala  
 245 250 255  
 Arg Asp Pro Met Ile Ser Ala Tyr Pro Ile Val Gly Val Gln Met Glu  
 260 265 270  
 Arg Leu Val Val Ser Lys Ser Glu Thr Ile Thr Gly Asp Ser Thr Lys  
 275 280 285  
 Ser Met Ser Lys Ser Thr Ser His Ser Ser Thr Asn Ile Asn Thr Val  
 290 295 300  
 Gly Ala Glu Val Ser Gly Ser Leu Gln Leu Ala Gly Gly Ile Phe Pro  
 305 310 315 320  
 Val Phe Ser Met Ser Ala Ser Ala Asn Tyr Ser His Thr Trp Gln Asn  
 325 330 335  
 Thr Ser Thr Val Asp Asp Thr Thr Gly Glu Ser Phe Ser Gln Gly Leu  
 340 345 350  
 Ser Ile Asn Thr Gly Glu Ser Ala Tyr Ile Asn Pro Asn Ile Arg Tyr  
 355 360 365  
 Tyr Asn Thr Gly Thr Ala Pro Val Tyr Asn Val Thr Pro Thr Thr Thr  
 370 375 380  
 Ile Val Ile Asp Lys Gln Ser Val Ala Thr Ile Lys Gly Gln Glu Ser  
 385 390 395 400  
 Leu Ile Gly Asp Tyr Leu Asn Pro Gly Gly Thr Tyr Pro Ile Ile Gly  
 405 410 415  
 Glu Pro Pro Met Ala Leu Asn Thr Met Asp Gln Phe Ser Ser Arg Leu  
 420 425 430  
 Ile Pro Ile Asn Tyr Asn Gln Leu Lys Ser Ile Asp Asn Gly Gly Thr  
 435 440 445  
 Val Met Leu Ser Thr Ser Gln Phe Thr Gly Asn Phe Ala Lys Tyr Asn  
 450 455 460  
 Ser Asn Gly Asn Leu Val Thr Asp Gly Asn Asn Trp Gly Pro Tyr Leu  
 465 470 475 480  
 Gly Thr Ile Lys Ser Thr Thr Ala Ser Leu Thr Leu Ser Phe Ser Gly  
 485 490 495  
 Gln Thr Thr Gln Val Ala Val Val Ala Pro Asn Phe Ser Asp Pro Glu  
 500 505 510  
 Asp Lys Thr Pro Lys Leu Thr Leu Glu Gln Ala Leu Val Lys Ala Phe  
 515 520 525  
 Ala Leu Glu Lys Lys Asn Gly Lys Phe Tyr Phe His Gly Leu Glu Ile  
 530 535 540  
 Ser Lys Asn Glu Lys Ile Gln Val Phe Leu Asp Ser Asn Thr Asn Asn  
 545 550 555 560  
 Asp Phe Glu Asn Gln Leu Lys Asn Thr Ala Asp Lys Asp Ile Met His  
 565 570 575  
 Cys Ile Ile Lys Arg Asn Met Asn Ile Leu Val Lys Val Ile Thr Phe  
 580 585 590  
 Lys Glu Asn Ile Ser Ser Ile Asn Ile Ile Asn Asp Thr Asn Phe Gly  
 595 600 605  
 Val Gln Ser Met Thr Gly Leu Ser Asn Arg Ser Lys Gly Gln Asp Gly  
 610 615 620  
 Ile Tyr Arg Ala Ala Thr Thr Ala Phe Ser Phe Lys Ser Lys Glu Leu  
 625 630 635 640

Lys Tyr Pro Glu Gly Arg Tyr Arg Met Arg Phe Val Ile Gln Ser Tyr  
 645 650 655  
 Glu Pro Phe Thr Cys Asn Phe Lys Leu Phe Asn Asn Leu Ile Tyr Ser  
 660 665 670  
 Ser Ser Phe Asp Lys Gly Tyr Tyr Asp Glu Phe Phe Tyr Phe Tyr Tyr  
 675 680 685  
 Asn Gly Ser Lys Ser Phe Phe Asn Ile Ser Cys Asp Ile Ile Asn Ser  
 690 695 700  
 Ile Asn Arg Leu Ser Gly Val Phe Leu Ile Glu Leu Asp Lys Leu Ile  
 705 710 715 720  
 Ile

<210> 35  
 <211> 1338  
 <212> PRT  
 <213> Bacillus cereus

2

<400> 35  
 Met Lys Arg Met Glu Gly Lys Leu Phe Met Val Ser Lys Lys Leu Gln  
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 Val Val Thr Lys Thr Val Leu Leu Ser Thr Val Phe Ser Ile Ser Leu  
 20 25 30  
 Leu Asn Asn Glu Val Ile Lys Ala Glu Gln Leu Asn Ile Asn Ser Gln  
 35 40 45  
 Ser Lys Tyr Thr Asn Leu Gln Asn Leu Lys Ile Thr Asp Lys Val Glu  
 50 55 60  
 Asp Phe Lys Glu Asp Lys Glu Lys Ala Lys Glu Trp Gly Lys Glu Lys  
 65 70 75 80  
 Glu Lys Glu Trp Lys Leu Thr Ala Thr Glu Lys Gly Lys Met Asn Asn  
 85 90 95  
 Phe Leu Asp Asn Lys Asn Asp Ile Lys Thr Asn Tyr Lys Glu Ile Thr  
 100 105 110  
 Phe Ser Ile Ala Gly Ser Phe Glu Asp Glu Ile Lys Asp Leu Lys Glu  
 115 120 125  
 Ile Asp Lys Met Phe Asp Lys Thr Asn Leu Ser Asn Ser Ile Ile Thr  
 130 135 140  
 Tyr Lys Asn Val Glu Pro Thr Thr Ile Gly Phe Asn Lys Ser Leu Thr  
 145 150 155 160  
 Glu Gly Asn Thr Ile Asn Ser Asp Ala Met Ala Gln Phe Lys Glu Gln  
 165 170 175  
 Phe Leu Asp Arg Asp Ile Lys Phe Asp Ser Tyr Leu Asp Thr His Leu  
 180 185 190  
 Thr Ala Gln Gln Val Ser Ser Lys Glu Arg Val Ile Leu Lys Val Thr  
 195 200 205  
 Val Pro Ser Gly Lys Gly Ser Thr Thr Pro Thr Lys Ala Gly Val Ile  
 210 215 220  
 Leu Asn Asn Ser Glu Tyr Lys Met Leu Ile Asp Asn Gly Tyr Met Val  
 225 230 235 240  
 His Val Asp Lys Val Ser Lys Val Val Lys Lys Gly Val Glu Cys Leu  
 245 250 255  
 Gln Ile Glu Gly Thr Leu Lys Lys Ser Leu Asp Phe Lys Asn Asp Ile  
 260 265 270  
 Asn Ala Glu Ala His Ser Trp Gly Met Lys Asn Tyr Glu Glu Trp Ala  
 275 280 285  
 Lys Asp Leu Thr Asp Ser Gln Arg Glu Ala Leu Asp Gly Tyr Ala Arg  
 290 295 300  
 Gln Asp Tyr Lys Glu Ile Asn Asn Tyr Leu Arg Asn Gln Gly Gly Ser



Ser Thr Asn Trp Ser Tyr Thr Asn Thr Glu Gly Ala Ser Val Glu Ala  
 785 790 795 800  
 Gly Ile Gly Pro Lys Gly Ile Ser Phe Gly Val Ser Val Asn Tyr Gln  
 805 810 815  
 His Ser Glu Thr Val Ala Gln Glu Trp Gly Thr Ser Thr Gly Asn Thr  
 820 825 830  
 Ser Gln Phe Asn Thr Ala Ser Ala Gly Tyr Leu Asn Ala Asn Val Arg  
 835 840 845  
 Tyr Asn Asn Val Gly Thr Gly Ala Ile Tyr Asp Val Lys Pro Thr Thr  
 850 855 860  
 Ser Phe Val Leu Asn Asn Asp Thr Ile Ala Thr Ile Thr Ala Lys Ser  
 865 870 875 880  
 Asn Ser Thr Ala Leu Asn Ile Ser Pro Gly Glu Ser Tyr Pro Lys Lys  
 885 890 895  
 Gly Gln Asn Gly Ile Ala Ile Thr Ser Met Asp Asp Phe Asn Ser His  
 900 905 910  
 Pro Ile Thr Leu Asn Lys Lys Gln Val Asp Asn Leu Leu Asn Asn Lys  
 915 920 925  
 Pro Met Met Leu Glu Thr Asn Gln Thr Asp Gly Val Tyr Lys Ile Lys  
 930 935 940  
 Asp Thr His Gly Asn Ile Val Thr Gly Gly Glu Trp Asn Gly Val Ile  
 945 950 955 960  
 Gln Gln Ile Lys Ala Lys Thr Ala Ser Ile Ile Val Asp Asp Gly Glu  
 965 970 975  
 Arg Val Ala Glu Lys Arg Val Ala Ala Lys Asp Tyr Glu Asn Pro Glu  
 980 985 990  
 Asp Lys Thr Pro Ser Leu Thr Leu Lys Asp Ala Leu Lys Leu Ser Tyr  
 995 1000 1005  
 Pro Asp Glu Ile Lys Glu Ile Glu Gly Leu Leu Tyr Tyr Lys Asn Lys  
 1010 1015 1020  
 Pro Ile Tyr Glu Ser Ser Val Met Thr Tyr Leu Asp Glu Asn Thr Ala  
 1025 1030 1035 1040  
 Lys Glu Val Thr Lys Gln Leu Asn Asp Thr Thr Gly Lys Phe Lys Asp  
 1045 1050 1055  
 Val Ser His Leu Tyr Asp Val Lys Leu Thr Pro Lys Met Asn Val Thr  
 1060 1065 1070  
 Ile Lys Leu Ser Ile Leu Tyr Asp Asn Ala Glu Ser Asn Asp Asn Ser  
 1075 1080 1085  
 Ile Gly Lys Trp Thr Asn Thr Asn Ile Val Ser Gly Gly Asn Asn Gly  
 1090 1095 1100  
 Lys Lys Gln Tyr Ser Ser Asn Asn Pro Asp Ala Asn Leu Thr Leu Asn  
 1105 1110 1115 1120  
 Thr Asp Ala Gln Glu Lys Leu Asn Lys Asn Arg Asp Tyr Tyr Ile Ser  
 1125 1130 1135  
 Leu Tyr Met Lys Ser Glu Lys Asn Thr Gln Cys Glu Ile Thr Ile Asp  
 1140 1145 1150  
 Gly Glu Ile Tyr Pro Ile Thr Thr Lys Thr Val Asn Val Asn Lys Asp  
 1155 1160 1165  
 Asn Tyr Lys Arg Leu Asp Ile Ile Ala His Asn Ile Lys Ser Asn Pro  
 1170 1175 1180  
 Ile Ser Ser Leu His Ile Lys Thr Asn Asp Glu Ile Thr Leu Phe Trp  
 1185 1190 1195 1200  
 Asp Asp Ile Ser Ile Thr Asp Val Ala Ser Ile Lys Pro Glu Asn Leu  
 1205 1210 1215  
 Thr Asp Ser Glu Ile Lys Gln Ile Tyr Ser Arg Tyr Gly Ile Lys Leu  
 1220 1225 1230  
 Glu Asp Gly Ile Leu Ile Asp Lys Lys Gly Gly Ile His Tyr Gly Glu  
 1235 1240 1245  
 Phe Ile Asn Glu Ala Ser Phe Asn Ile Glu Pro Leu Gln Asn Tyr Val

1250		1255		1260
Thr Lys Tyr Glu Val	Thr Tyr Ser Ser	Glu Leu Gly Pro	Asn Val Ser	
1265	1270	1275	1280	
Asp Thr Leu Glu Ser	Asp Lys Ile Tyr	Lys Asp Gly Thr	Ile Lys Phe	
	1285	1290	1295	
Asp Phe Thr Lys Tyr	Ser Lys Asn Glu	Gln Gly Leu Phe	Tyr Asp Ser	
	1300	1305	1310	
Gly Leu Asn Trp Asp	Phe Lys Ile Asn	Ala Ile Thr Tyr	Asp Gly Lys	
	1315	1320	1325	
Glu Met Asn Val Phe	His Arg Tyr Asn	Lys		
1330	1335			

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